



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
09/892,476	06/28/2001	Joun Ho Lee	8733.481.00	3748	
30827	7590	10/27/2003	EXAMINER		
MCKENNA LONG & ALDRIDGE LLP				KIELIN, ERIK J	
1900 K STREET, NW				ART UNIT	
WASHINGTON, DC 20006				PAPER NUMBER	
				2813	

DATE MAILED: 10/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/892,476	LEE ET AL.
	Examiner	Art Unit
	Erik Kielin	2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 18 August 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 4,7,9 and 16-20 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-3,5,6,8 and 10-15 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 August 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action responds to the Amendment and Substitute Drawings, each filed 18 August 2003 in Paper no. 11.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings were received on 18 August 2003. These drawings are acceptable.

Claim Objections

3. Claim 10 is objected to because of the following informalities:
in line 16, replace “disclinationdisclination” with --disclination-- to correct typographical error. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. Claims 1-3, 5, 6, and 9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Independent claim 1 recites the newly added limitation, “to maintain an electric field generated between the common electrodes and the data electrodes in the same direction as the rubbing direction.” This is not possible. Fig. 4, **the elected species**, shows that the rubbing

direction is at a 135° angle. By contrast, the data and common electrodes generate electric field lines which are both parallel to the page and run from left to right or right to left --i.e. either 0° or 180°-- which is not the same as the rubbing direction of 135°. Accordingly, one of ordinary skill could not make or use the invention, as presently claimed.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 5, 6, 8, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,281,958 B1 (**Nakajima**).

Nakajima discloses an in-plane switching mode LCD device (Title) comprising:
first **20** and second **21** substrates (col. 3, line 44; Fig. 2);
gate lines **39** (called “source line” in Nakajima) and data lines **31** defining a pixel region on the first substrate (Fig. 3);
a plurality of common **33** and data electrodes **40** (called “pixel electrodes” in Nakajima) formed to cross one another within the pixel region at constant intervals;
a common line **32** formed in parallel with the gate line **31**, the common electrodes **33** being diverged from the common line **32**;
a thin film transistor **38** formed in a crossing portion of the gate and data lines; and

a liquid crystal layer **16** (Fig. 2) formed between the first **20** and second **21** substrates, wherein the data electrodes **40** are connected with the thin film transistor at one side and the data electrodes overlap the common line at a minimum area so as to maintain an electric field generated between the common electrodes and the data electrodes in the same direction as the rubbing direction (called “initial aligning angle” in Lee at col. 7, line 25, for example; col. 7, lines 13-61). In this regard, Lee states at col. 7, lines 35-61,

“Therefore, unlike the conventional arrangement [of the pixel electrode and common electrodes/line], the present embodiment does **not** cause a difference between the inclining direction of the **electric line of force** [i.e. the electric field] and the **initial aligning direction** [i.e. rubbing direction] **of the liquid crystal molecules**, partially within the same pixel, especially on ends of the display section. Namely, the inclining directions of the electric lines of force **18** are set so as to be even within the same pixel, and the **initial aligning directions of the liquid crystal molecules 19** are set so as to be the same as the inclining direction of the **electric lines of force 18**. With this arrangement, for example, when voltage is applied, the liquid crystal molecules **19** rotate to the right in the entire pixel in the liquid crystal display panel of the present embodiment; therefore, it becomes possible to **considerably improve the display quality as compared with the conventional arrangement**. Additionally, the state of a rotating liquid crystal molecule during the application of voltage will be described later.” (Emphasis added.)

“As described above, **the initial aligning angle of the liquid crystal molecule 19 is not particularly limited as long as the initial aligning angle is set in accordance with the inclining direction of the electric line of force 18** of the display section **17**. For example, it is possible to obtain sufficient contrast in the case when the angle ranges between 0° to 45° in the clockwise direction in the FIG. 1 with regard to the branching wires of the pixel electrode **10** and the common electrode **3** which are disposed orthogonally to the common line **2**. Here, the angle is set at 2° in the present embodiment.” (Emphasis added.)

(See also col. 3, lines 58-62; section entitled “EMBODIMENT 3” beginning at col. 11, line 1 -- especially col. 13, lines 5-15.)

Regarding claim 2, the plurality of common electrodes 33 include a first common electrode formed in parallel with the data line 39 and diverged from the common line 32 within the pixel region;

a second common electrode 33 formed with at least one data electrode 40 interposed between the first common electrode 33 and the second common electrode 33 in parallel with the first common electrode 33 and diverged from the common line 32; and

a third common electrode 33 formed with at least one data electrode 40 interposed between the second common electrode 33 and the third common electrode 33, the second common electrode having one end connected with one end of the second common electrode (i.e. by the common line 32).

Regarding claim 5, the overlap of the data electrodes 40 overlapped with the common line 32 form edge portions that are selectively located inside and outside the common line.

Regarding claim 6, the selective inside and outside locations of the edge portions are based on a rubbing direction 49 (called “initial inclination direction” in Lee; col. 7, lines 13-61).

Regarding claim 8, the data electrodes 40 have one side connected with the thin film transistors 38 and the other side overlapped with the common line 32.

Regarding claim 10, Nakajima discloses an in-plane switching liquid crystal display device, comprising:

a plurality of parallel data lines 69 (Fig. 4);

a plurality of gate lines 61, crossing the data lines 69, such that a pixel region is defined by the data and gate lines;

a thin film transistor **68** comprising source, drain and gate electrodes formed at a crossing point of the data and gate lines;

a common line **62** within the pixel region;

a plurality of common electrodes **63** extending in a direction perpendicular to the common line **62**;

a plurality of data electrodes **70** parallel to the common electrodes **63**, first ends of the data electrodes connected to the drain of said thin film transistor **68**, the data electrodes **70** and the common electrodes **63** forming an alternating pattern; and

a transverse data electrode **70** overlying the common line **62** and connecting second ends of the data electrodes **70**, the transverse data electrode **70** having a first portion having a first width and a second portion having a second width, wherein the first width is less than the second width; wherein the first width is sufficiently narrow that disinclination is removed.

(Disinclination is necessarily removed because Nakajima teaches that the liquid crystal functions properly everywhere at col. 3, lines 58-62 and col. 7, lines 13-61.)

7. Claims **1**, **2**, **5**, **6**, **8**, and **10-12** are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,341,003 B1 (**Ashizawa et al.**).

Regarding claim **1**, **Ashizawa** discloses an in-plane switching mode LCD device comprising:

first and second substrates (**SUB1**, **SUB2**, Fig. 2);

gate lines **GL** and data lines **DL** defining a pixel region on the first substrate (Figs. 16, 18, 19, 21, 22);

a plurality of common **CT** and data electrodes **PX** (called “pixel electrodes” in Ashizawa) formed to cross one another within the pixel region at constant intervals;

a common line **CL** formed in parallel with the gate line **GL**, the common electrodes **CT** being diverged from the common line **CL**;

a thin film transistor **TFT** formed in a crossing portion of the gate and data lines; and

a liquid crystal layer (**LC**, Fig. 2) formed between the first and second substrates, wherein the data electrodes **PX** are connected with the thin film transistor at one side and the data electrodes overlap the common line at a minimum area so as to maintain an electric field generated between the common electrodes and the data electrodes in the same direction as a rubbing direction, as shown for example in Fig. 21 (col. 4, lines 18-29; col. 21, line 54 to col. 24, line 22). In this regard, Ashizawa states at col. 24,

Regarding claim 2, the common electrodes **CT** include a first common electrode formed in parallel with the data line **TFT** and diverged from the common line **CL** within the pixel region (Fig. 18);

a second common electrode **CT** formed with at least one data electrode **PX** interposed between the first common electrode **CT** and the second common electrode **CT** in parallel with the first common electrode **CT** and diverged from the common line **CL** (Fig. 18); and

a third common electrode **CT** formed with at least one data electrode **PX** interposed between the second common electrode **CT** and the third common electrode **CT**, having one end connected with one end of the second common electrode (i.e. by the common line **CL**) (Figs. 18).

Regarding claim 5, the overlap of the data electrodes **PX** with the common line **CL** form edge portions that are selectively located inside and outside the common line (Figs. 16, 18, 19, 21, 22).

Regarding claim 6, the selective inside and outside locations of the edge portions are based upon a rubbing direction, **as shown for example in Fig. 21** (col. 4, lines 18-29; col. 21, line 54 to col. 24, line 22; Figs. 16, 18, 19, 21, 22).

Regarding claim 8, the data electrodes **PX** have one side connected with the thin film transistor **TFT** and the other side overlapped with the common line **CL**.

Regarding claim 10, **Ashizawa** discloses an in-plane switching liquid crystal display device, comprising:

a plurality of parallel data lines **DL** (Fig. 32);

a plurality of gate lines **GL**, crossing the data lines **DL**, such that a pixel region is defined by the data and gate lines;

a thin film transistor **TFT** comprising source, drain and gate electrodes formed at a crossing point of the data and gate lines;

a common line **CL** within the pixel region;

a plurality of common electrodes **CT** extending in a direction perpendicular to the common line **CL**;

a plurality of data electrodes **PX** parallel to the common electrodes **CT**, first ends of the data electrodes connected to the drain of said thin film transistor **TFT**, the data electrodes **PX** and the common electrodes **CT** forming an alternating pattern; and

a transverse data electrode **Cstg** overlying the common line **CL** and connecting second ends of the data electrodes **PX**, the transverse data electrode **Cstg** having a first portion having a first width and a second portion having a second width, wherein the first width is less than the second width; wherein the first width is sufficiently narrow that disinclination is removed. (Disinclination is necessarily removed because Ashizawa teaches that the common and data electrodes are fashioned to prevent alignment problems due to the rubbing (alignment) direction of the liquid crystals, which Applicant indicates is the problem leading to disinclination. See col. 4, lines 18-29; col. 21, line 54 to col. 24, line 22; Figs. 16, 18, 19, 21, 22.)

Regarding claim 11, the first ends of the common electrodes **CT** intersect the common line **CL** wherein at least one corner portion of a vertex of the intersection of the common electrodes **CT** and the common line **CL** is rounded (Fig. 38(A)); and

wherein at least one corner portion of a vertex of a connecting point of the second ends of the data electrodes **PX** and the transverse data electrode is substantially rounded (Fig. 38(A)).

Regarding claim 12, the first portion of the transverse data electrode (not labeled, but shown as the connecting portion of the data electrodes **PX** overlying the common line **CL**; Fig. 18) corresponds to the at least one corner portion of the vertex of the intersection of the common electrodes **CT** and the common line **CL**.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakajima** in view of either of Applicant's admitted prior art (**APA**).

Regarding claim 3, **Nakajima** discloses, the data electrodes **70** include a first data electrode having one side connected with the thin film transistor **68** and the other side extended to an upper portion of the common line **62**, and a second data electrode **70** formed between the second common electrode **63** and the third common electrode **63**, wherein the second data electrode **70** is connected with the first data electrode **70** at the upper portion of the common line **62** (Fig. 4). **Nakajima** also discloses in Fig. 3 that the first and second data electrodes are connected at "the one side of the transistor" and at the opposite side.

Nakajima does not show **in a single embodiment** the combination that the first and second data electrodes are connected both at "the one side of the first data electrode" near the transistor and also over the common line.

APA teaches that the connection of the first and second data electrodes at "the one side" and over the common line is conventional in prior art Fig. 2

It would have been obvious for one of ordinary skill in the art, at the time of the invention to connect the first and second data electrodes over the common line and at "the one side of the first data electrode" because **Nakajima** teaches each configuration separately and because **APA** teaches that this configuration is conventional. Moreover, this feature is not shown to be critical to the objective of the invention, which is instead to form the data and common electrodes so that the electric field generated thereby is aligned with the initial alignment of the liquid crystals.

Where the data electrodes connect has not been shown to affect said objective.

Regarding claim 11, as noted above, **Nakajima** discloses each of the features of claim 10 and additionally, that first ends of the common electrodes **62** intersect the common line **62** and that the data electrodes **70** have an intersecting point with the transverse electrode **70** (Fig. 4). But **Nakajima** does not indicate (1) that at least one corner portion of a vertex of the intersection of the common electrodes and the common line is rounded; and (2) that at least one corner portion of a vertex of a connecting point of the second ends of the data electrodes and the transverse data electrode is substantially rounded. In short, **Nakajima** does not indicate that the corners formed at the intersection points of the electrodes with the lines are rounded.

APA in paragraph [19] states that such corners are inherently rounded. It would have been obvious for one of ordinary skill in the art, at the time of the invention to form the corners of **Nakajima** to be rounded, because **APA** states that this occurs as a matter of the manufacturing and that only in “design” are the corners shown to be “right angles.”

Regarding claim 12, **Nakajima** discloses that the first portion of the transverse data electrode corresponds to the at least one corner portion of the vertex of the intersection of the common electrodes and the common line.

Regarding claim 13, **Nakajima** does not disclose that the LCD further comprises a transverse common electrode connected to second ends of the common electrodes, wherein at least one corner portion of a vertex of the intersection of the common electrodes and the transverse common electrode is rounded.

APA prior art Fig. 2C teaches that the transverse common electrode is a common configuration and that it is known to round the corners of the intersection between the electrodes and the transverse electrodes (paragraph [19]).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to apply the features of the **APA** to **Nakajima** to connect the common electrodes ends opposite the common line and to round the corners, because **APA** teaches that this is common in the art.

Regarding claims 14 and 15, **Nakajima** does not disclose that the second ends of the data electrodes **40** (Fig. 3) connect to a second transverse data electrode, the second transverse data electrode having a third portion having a third width and a fourth portion having a fourth width, wherein the third width is less than the fourth width (instant claim 14). **Nakajima** also fails to disclose that the third portion of the second transverse data electrode corresponds to the at least one corner portion of the vertex of the intersection of the common electrodes and the transverse common electrode (instant claim 15).

APA prior art Fig. 2C shows these features.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to apply the features of the **APA** to **Nakajima** to connect the data electrodes ends opposite the first transverse electrode, because **APA** teaches that this is common in the art.

Response to Arguments

10. Applicant's arguments filed 18 August 2003 (Paper no. 11) have been fully considered but they are not persuasive.

Applicant argues that Nakajima does not disclose the newly added limitation to the claims of,

"the data electrodes **40** are connected with the thin film transistor at one side and the data electrodes overlap the common line at a minimum area so as to maintain an electric field generated between the common

electrodes and the data electrodes in the same direction as the rubbing direction.”

Applicant ignores the express teachings in Nakajima. This feature is very clearly disclosed in Nakajima as noted above in the rejection of the claims over Nakajima as stated in the excerpt from Nakajima.

Applicant argues that Nakajima fails to disclose,

“a transverse data electrode overlying the common line and connecting second ends of the data electrodes, the transverse data electrode having a first portion having a first width and a second portion having a second width, wherein the first width is less than the second width.”

Again, Applicant ignores the express teachings in Nakajima. This feature is very clearly disclosed in Nakajima as noted above in the rejection of the claims over Nakajima.

Applicant argues the Ashizawa does not disclose the feature,

“a common line formed in parallel with the gate line, **the common lines being diverged from the common line...**”

This argument defies logic. It is impossible for a line to diverge from itself.

Applicant continues that Ashizawa does not disclose the feature,

“the data electrodes **40** are connected with the thin film transistor at one side and the data electrodes overlap the common line at a minimum area so as to maintain an electric field generated between the common electrodes and the data electrodes in the same direction as the rubbing direction.”

Applicant ignores the express teachings in Ashizawa. This feature is very clearly disclosed in Ashizawa as noted above in the rejection of the claims over Ashizawa, and as shown in Fig. 21.

Applicant argues that Ashizawa fails to disclose,

“a transverse data electrode overlying the common line and connecting second ends of the data electrodes, the transverse data electrode having a

first portion having a first width and a second portion having a second width, wherein the first width is less than the second width."

Again, Applicant ignores the express teachings in Ashizawa. This feature is very clearly disclosed in Ashizawa as noted above in the rejection of the claims over Ashizawa and as shown in many Figs.

Conclusion

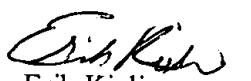
11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 703-306-5980. The examiner can normally be reached on 9:00 - 19:30 on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Erik Kielin
Primary Examiner
October 24, 2003